

What is claimed is:

1. A method of treating patients with eating disorders by use of a therapy which alleviates a symptom of the disorder, which comprises the steps of:
 - responding to a specific eating disorder of interest by applying a predetermined stimulating signal to the patient's vagus nerve appropriate to alleviate said symptom of the eating disorder of interest; and
 - applying a neural conduction block to the vagus nerve at a blocking site with said neural conduction block selected to at least partially block nerve impulses on said vagus nerve at said blocking site.
2. A method according to claim 1 wherein said neural conduction block is applied to said nerve between a location of application of said stimulating signal and an organ to be shielded from adverse effects of said stimulating signal.
3. A method according to claim 1 wherein said neural conduction block is applied during application of said stimulating signal.
4. A method according to claim 1 wherein application of said neural conduction block is variable by a controller to alter a characteristic of said block.
5. A method according to claim 1 wherein said neural conduction block is a cryogenic block.
6. A method according to claim 1 wherein said neural conduction block is a pharmacologic block.
7. A method according to claim 1 wherein said neural conduction block is an electrical conductive block.

8. A method according to claim 1 comprising detecting a preselected event indicative of an imminent need for treatment of the specific eating disorder of interest and said responding includes responding to the detected occurrence.

9. A method according to claim 1, wherein the disorder is compulsive eating to excess, and said stimulating signal is predetermined to produce a sensation of satiety in the patient.

10. A method according to 1, wherein said stimulating signal is applied to the patient's vagus nerve by a nerve electrode implanted on the nerve in the vicinity of the patient's stomach.

11. Apparatus for treating patients with eating disorders by application of a modulating signal to the patient's vagus nerve to stimulate or inhibit neural impulses and produce excitatory or inhibitory neurotransmitter release by the nerve according to the specific nature of the eating disorder, comprising:

- a neurostimulator for generating an electrical output signal in response to activation thereof, said neurostimulator means including:

- a stimulating electrode responsive to generation of the electrical output signal by said neurostimulator means for application thereof as said modulating signal to the patient's vagus nerve.

- an electrically controllable neural conduction electrode adapted to be electrically coupled to said vagus nerve at a blocking site between said stimulating electrode and an organ to be shielded from adverse effects of said stimulating electrode; and

- a blocking signal generator for generating a blocking signal selected to at least partially block nerve impulses on said vagus nerve at said blocking site.

12. An apparatus according to claim 11, a sensor for detecting the occurrence of a selected event indicative of the need for imminent treatment of the eating disorder, and including an activator responsive to the detection for activating said neurostimulator.

13. An apparatus according to claim 11 wherein said neural conduction block is applied during application of said stimulating signal.
14. A method according to claim 11 wherein application of said neural conduction block is variable by a controller to alter a characteristic of said block.
15. A method according to claim 11 wherein said neural conduction block is a cryogenic block.
16. A method according to claim 11 wherein said neural conduction block is a pharmacologic block.
17. A method according to claim 11 wherein said neural conduction block is an electrical conductive block.
18. A neurostimulator for treatment of eating disorders in human patients, comprising an implantable electrical signal generator,
programming means for selectively programming the parameters of the electrical signal generated by the generator to modulate electrical activity of the patient's vagus nerve to evoke different sensations by the patient according to the nature of the eating disorder being treated,
means for applying the generated signal to the patient's vagus nerve,
means for detecting a symptom of the eating disorder being treated to activate the generation of the programmed electrical signal by the generator;
an electrically controllable neural conduction electrode adapted to be electrically coupled to said vagus nerve at a blocking site between said stimulating electrode and an organ to be shielded from adverse effects of said stimulating electrode; and
a blocking signal generator for generating a blocking signal selected to at least partially block nerve impulses on said vagus nerve at said blocking site.

19. A method for treating and controlling compulsive eating disorders characterized by compulsive action exhibited by the individual suffering from the disorder, which comprises the steps of:

detecting a known symptom of the eating disorder of interest indicative of imminent need for intervention to control the disorder,

responding to the detected occurrence of said symptom by modulating the vagal activity of the individual suffering the eating disorder to treat the symptom and deter the compulsive action associated with the disorder;

applying a neural conduction block to the vagus nerve at a blocking site with said neural conduction block selected to at least partially block nerve impulses on said vagus nerve at said blocking site.

20. A method of treating patients with eating disorders, which comprises the steps of:

detecting the commencement of a customary mealtime according to the patient's circadian cycle, as being indicative of an imminent need for treatment of the patient's eating disorder;

responding to the detected commencement of the customary mealtime by applying a predetermined stimulating signal to the patient's vagus nerve appropriate to alleviate the patient's eating disorder; and

applying a neural conduction block to the vagus nerve at a blocking site with said neural conduction block selected to at least partially block nerve impulses on said vagus nerve at said blocking site.

21. A method of treating patients with an eating disorder associated with compulsive refusal to eat, which comprises the steps of:

detecting the commencement of a preselected event indicative of an imminent need for treatment of the patient's eating disorder;

responding to the detected occurrence of the preselected event by applying a predetermined stimulating signal to the patient's vagus nerve appropriate to alleviate the patient's eating disorder, said stimulating signal being predetermined to suppress a sensation of satiety in the patient; and

applying a neural conduction block to the vagus nerve at a blocking site with said neural conduction block selected to at least partially block nerve impulses on said vagus nerve at said blocking site.

22. Apparatus for the treatment of patients suffering from eating disorders, in which the apparatus has an implantable neurostimulator device adapted to generate a preprogrammed electrical output signal upon activation of the device, and an implantable electrical lead assembly connectable to the neurostimulator device and with an electrode adapted to be secured to the patient's vagus nerve for electrical excitation of the nerve to modulate its electrical activity, characterized in that:

the apparatus further includes sensor means electrically coupled to the neurostimulator device for detecting the occurrence of a predetermined event associated with the eating disorder of interest;

activator means electrically coupled to the neurostimulator device and responsive to detection of the predetermined event to activate the neurostimulator device to apply its preprogrammed electrical output signal to the electrical lead assembly for electrical excitation of the vagus nerve to modulate the electrical activity of the nerve so as to stimulate or inhibit neural impulses and produce excitatory or inhibitory neurotransmitter release by the vagus nerve according to the specific nature of the eating disorder; and

an electrically controllable neural conduction electrode adapted to be electrically coupled to said vagus nerve at a blocking site between said stimulating electrode and an organ to be shielded from adverse effects of said stimulating electrode; and

a blocking signal generator for generating a blocking signal selected to at least partially block nerve impulses on said vagus nerve at said blocking site.

23. A new use for a neurostimulator device adapted to be implanted in a human patient, in which the device comprises an electrical signal generator which is programmable to generate an electrical output signal having selected signal parameters, and an electrical lead adapted to be connected to the signal generator including an electrode adapted to be implanted on the patient's vagus nerve to modulate the electrical activity of the nerve in response to application of the programmed electrical output signal

from the signal generator to the lead, the new use of the neurostimulator device characterized by therapeutic treatment and control of an eating disorder of the patient, including the steps of:

- detecting the occurrence of a predetermined event associated with the eating disorder of interest;

- upon detection of the predetermined event, activating the neurostimulator device to apply the programmed electrical output signal of the signal generator to the lead for electrical excitation of the vagus nerve to modulate the electrical activity of the nerve so as to stimulate or inhibit neural impulses and produce excitatory or inhibitory neurotransmitter release by the vagus nerve according to the specific nature of the eating disorder; and

- applying a neural conduction block to the vagus nerve at a blocking site with said neural conduction block selected to at least partially block nerve impulses on said vagus nerve at said blocking site.

24. A method of controlling the function of a neurostimulator device adapted to be implanted in a human patient, including the following steps:

- selecting parameters including pulse amplitude, pulse width and on and off times of an electrical output signal of a pulse generator to develop an electrical signal for treating an eating disorder of the patient for application to a lead/electrode assembly implanted on the vagus nerve of the patient to appropriately modulate the electrical activity of the nerve;

- programming the pulse generator after implantation to set the selected parameters of its electrical output signal for treatment of said eating disorder; and

- applying a neural conduction block to the vagus nerve at a blocking site with said neural conduction block selected to at least partially block nerve impulses on said vagus nerve at said blocking site.

25. A method of treating patients for obesity, which comprises the steps of:

- performing bilateral stimulation of the patient's vagus nerve by applying a stimulating electrical signal directly and intermittently to the right and left vagi, wherein

the parameters of said signal are predetermined to produce a sensation of satiety in the patient; and

applying a neural conduction block to the vagus nerve at a blocking site with said neural conduction block selected to at least partially block nerve impulses on said vagus nerve at said blocking site.

26. A method of treating patients for obesity, which comprises the steps of:

bilaterally stimulating the patient's vagus nerve by chronically applying a stimulating electrical signal intermittently to the right and left vagi, the parameters of said signal being selected to produce a sensation of satiety in the patient; and

applying a neural conduction block to the vagus nerve at a blocking site with said neural conduction block selected to at least partially block nerve impulses on said vagus nerve at said blocking site.

27. A method of treating patients for obesity, which comprises the steps of:

implanting separate nerve stimulator generators into the patient;
bilaterally stimulating The patient's vagus nerve by applying a stimulating electrical signal intermittently to the right and left vagi from said implanted separate nerve stimulator generators, the parameters of said signal being selected to produce a sensation of satiety in the patient; and

applying a neural conduction block to the vagus nerve at a blocking site with said neural conduction block selected to at least partially block nerve impulses on said vagus nerve at said blocking site.

28. A method of treating patients for obesity, which comprises the steps of:

implanting nerve stimulator generator apparatus into the patient;
bilaterally stimulating the patient's vagus nerve by applying a stimulating electrical signal intermittently to the right and left vagi from said implanted nerve stimulator generator apparatus, the parameters of said signal being selected to produce a sensation of satiety in the patient; and

applying a neural conduction block to the vagus nerve at a blocking site with said neural conduction block selected to at least partially block nerve impulses on said vagus nerve at said blocking site.

29. A method of treating patients for obesity, which comprises the steps of:

implanting separate nerve stimulator generators into the patient;
bilaterally stimulating the patient's vagus nerve by applying a stimulating electrical signal in the form of a pulse signal having a prescribed on-off duty cycle continuously to the right and left vagi from said implanted separate nerve stimulator generators, so that pulses are applied during the on portion of said duty cycle and not during the off portion of said duty cycle, the parameters of said signal being selected to produce a sensation of satiety in the patient; and

applying a neural conduction block to the vagus nerve at a blocking site with said neural conduction block selected to at least partially block nerve impulses on said vagus nerve at said blocking site.

30. A method of treating patients for compulsive overeating, which comprises the steps of:

directly stimulating the left and right branches of the patient's vagus nerve simultaneously with electrical pulses in a predetermined sequence of a first period in which pulses are applied continuously, alternating with a second period in which no pulses are applied; and

applying a neural conduction block to the vagus nerve at a blocking site with said neural conduction block selected to at least partially block nerve impulses on said vagus nerve at said blocking site.

31. A method of treating obese patients by applying a therapy to reduce the patient's appetite, which comprises the steps of:

bilaterally stimulating the left and right branches of the patient's vagus nerve with an electrical signal applied directly or indirectly to both of said branches at a location below the patient's diaphragm, including programming electrical and timing parameters

of said electrical signal, to give the patient a sensation of satiety and thereby induce weight loss of the patient; and

applying a neural conduction block to the vagus nerve at a blocking site with said neural conduction block selected to at least partially block nerve impulses on said vagus nerve at said blocking site.